

WHAT IS CLAIMED IS:

1. A focus adjustment method for an optical writing unit, said focus adjustment method comprising:

a pattern image forming process for forming a test pattern including multiple pattern elements of varying density levels corresponding to different amounts of adjustment by projecting light modulated by image data of the test pattern from an array of multiple light-emitting elements corresponding to pixels arranged along a main scanning direction over an image forming area onto a surface of an image-carrying member, converting an electrostatic latent image formed on the surface of the image-carrying member into a visible toner image, and transferring the toner image from the surface of the image-carrying member onto a printing medium; and

a position adjustment process for adjusting the position of the optical writing unit relative to the surface of the image-carrying member by the amount of adjustment indicated by the density levels of the multiple pattern elements of the test pattern formed on the printing medium.

2. The focus adjustment method for the optical writing unit according to claim 1, wherein said pattern image forming process is a process in which the individual

pattern elements of the test pattern are uninterruptedly formed generally all along the main scanning direction in the image forming area.

3. The focus adjustment method for the optical writing unit according to claim 1, wherein said pattern image forming process is a process in which the diameter of individual dots constituting the pattern elements of the test pattern is varied according to the density levels of the pattern elements.

4. The focus adjustment method for the optical writing unit according to claim 1, wherein said pattern image forming process is a process in which the pattern elements of the test pattern are binary pattern elements formed of the pixels according to their varying density levels.

5. The focus adjustment method for the optical writing unit according to claim 3, wherein said pattern image forming process is a process in which light-emitting time of the individual light-emitting elements is controlled according to the density levels of the individual pattern elements of the test pattern.

6. The focus adjustment method for the optical writing

unit according to claim 3, wherein said pattern image forming process is a process in which light-emitting power input to the individual light-emitting elements is controlled according to the density levels of the individual pattern elements of the test pattern.

7. The focus adjustment method for the optical writing unit according to claim 1, wherein said pattern image forming process is a process in which adjustment quantity information showing the amount of adjustment corresponding to the density levels of the individual pattern elements is indicated on the test pattern.

8. The focus adjustment method for the optical writing unit according to claim 1 further comprising an assembly process for installing the optical writing unit at an offset position closer to or farther away from the image-carrying member than a position where the focal point of the light emitted from the individual light-emitting elements is expected to coincide with the surface of the image-carrying member before execution of said pattern image forming process.

9. The focus adjustment method for the optical writing unit according to claim 8, wherein said assembly process is

performed when both ends of the optical writing unit at extremities of the image forming area in the main scanning direction are affixed to an adjustment mechanism.

10. A focus adjustment device for an optical writing unit, said focus adjustment device comprising:

a memory for storing data on a test pattern including multiple pattern elements of varying density levels corresponding to different amounts of adjustment;

an image former for performing image forming operation to form the test pattern stored in the memory; and

an adjustment mechanism for varying the position of the optical writing unit relative to a surface of an image-carrying member in a direction of light emitted from multiple light-emitting elements corresponding to pixels arranged along a main scanning direction over an image forming area according to said amounts of adjustment such that the focal point of the light emitted from the individual light-emitting elements coincides with the surface of the image-carrying member.

11. The focus adjustment device for the optical writing unit according to claim 10, wherein said adjustment mechanism includes:

a retainer for holding the optical writing unit via a

moving mechanism in such a way that the position of the optical writing unit relative to the surface of the image-carrying member can be freely varied in the direction of the light emitted from the light-emitting elements;

an actuator for providing the moving mechanism with motive power for varying the position of the optical writing unit; and

a controller for controlling operation of the actuator according to said amounts of adjustment.

12. The focus adjustment device for the optical writing unit according to claim 10, wherein said adjustment mechanism includes an input section for accepting an input of the amount of adjustment determined with reference to an image of the test pattern formed on a printing medium by the image forming operation based on the data stored in the memory.

13. The focus adjustment device for the optical writing unit according to claim 10, wherein said adjustment mechanism varies the position of the optical writing unit relative to the surface of the image-carrying member in the direction of the light emitted from the light-emitting elements according to the amount of adjustment determined from image data obtained by reading an image of the test

pattern formed on a printing medium by the image forming operation based on the data stored in the memory.

14. The focus adjustment device for the optical writing unit according to claim 10, wherein the individual pattern elements of the test pattern uninterruptedly extend generally all along the main scanning direction in the image forming area.

15. The focus adjustment device for the optical writing unit according to claim 10, wherein said image former varies the diameter of individual dots constituting the pattern elements of the test pattern according to the density levels of the pattern elements.

16. The focus adjustment device for the optical writing unit according to claim 10, wherein said image former forms binary pattern elements made of different numbers of pixels according to the varying density levels of the individual pattern elements of the test pattern.

17. The focus adjustment device for the optical writing unit according to claim 15, wherein said image former controls light-emitting time of the individual light-emitting elements according to the density levels of

the individual pattern elements of the test pattern.

18. The focus adjustment device for the optical writing unit according to claim 15, wherein said image former controls light-emitting power input to the individual light-emitting elements according to the density levels of the individual pattern elements of the test pattern.

19. The focus adjustment device for the optical writing unit according to claim 10, wherein the test pattern shows adjustment quantity information denoting the amount of adjustment corresponding to the density levels of the individual pattern elements.

20. The focus adjustment device for the optical writing unit according to claim 10, wherein said adjustment mechanism varies the position of the optical writing unit to an offset position closer to or farther away from the image-carrying member than a position where the focal point of the light emitted from the individual light-emitting elements is expected to coincide with the surface of the image-carrying member before execution of the image forming operation by said image former.

21. An image forming apparatus comprising a focus adjustment device for performing electrophotographic image forming operation by projecting light modulated by image data onto an image-carrying member from an optical writing unit of which position relative to a surface of the image-carrying member has been adjusted by means of said focus adjustment device which includes:

a memory for storing data on a test pattern including multiple pattern elements of varying density levels corresponding to different amounts of adjustment;

an image former for performing image forming operation to form the test pattern stored in the memory; and

an adjustment mechanism for varying the position of the optical writing unit relative to the surface of the image-carrying member in a direction of light emitted from multiple light-emitting elements corresponding to pixels arranged along a main scanning direction over an image forming area according to said amounts of adjustment such that the focal point of the light emitted from the individual light-emitting elements coincides with the surface of the image-carrying member.

22. The image forming apparatus according to claim 21 further comprising an image reader for reading an original image, and said focus adjustment device further including a

controller for determining the amount of adjustment of the optical writing unit based on the test pattern which is formed on a printing medium by the image former of said focus adjustment device and read by said image reader.